

U.S. EPA Landfill Methane Outreach Program Preliminary Screening Analysis Report for Golden Triangle Regional Landfill

A landfill gas generation curve was developed for the Golden Triangle Regional Landfill in Starkville, MS, using several parameters specific to the landfill and defaults from AP-42¹. These data were entered into the EPA LandGEM² software to estimate landfill gas production, beginning with the year after the landfill opened. The values of these model input parameters are provided in Table 1. Landfill-specific data were obtained from an email³, which is included in Appendix A. These data include the year the landfill opened, the landfill capacity, and the annual waste acceptance rate. Although waste-in-place was also provided in the email³, the annual waste acceptance rate was used as the primary input to the EPA LandGEM² software for years 1996 to 2001.

Also necessary for the model to run are the following parameters: L_0 (methane generation potential), k (methane generation rate constant), and the percent volume of methane and carbon dioxide in the landfill gas. Defaults from AP-42 were used for L_0 and k , and LandGEM software defaults were used for the percent methane and carbon dioxide. The AP-42 default value for k for non-arid areas was used because several sources indicated an average annual precipitation of greater than 25 inches for the area surrounding the landfill.

Collection of the landfill gas at its estimated extraction rate of 1,249 scfm in 2056 would be equivalent to any of the following annual environmental benefits for that year:

Removing emissions equivalent to 29,000 cars for one year
Planting 39,500 acres of forest
Offsetting the use of 655 railroad cars of coal
Preventing the use of 310,000 barrels of oil

Table 1: Model Input Parameters for the Golden Triangle Regional Landfill

Model Parameter	Value	Units
Year Landfill Opened	1996	----
Calculated Landfill Closure Year	2115	----
Waste Capacity	15,460,000	tons
Waste-In-Place (as of 1-16-02)	610,949	tons
Annual Waste Acceptance Rate	130,000	tons/yr
Methane Generation Rate Constant (k)	0.04	1/yr
Methane Generation Potential (L _o)	3,203	ft ³ /ton
Percent Methane in Landfill Gas	50	%
Percent Carbon Dioxide in Landfill Gas	50	%

The estimated waste-in-place in tons and landfill gas generation in standard cubic feet per minute (scfm) for a 150-year period are shown in Table 2. Also provided is the estimated amount of landfill gas recovered over time, which was calculated using the assumption of an 85% collection rate. The graph was created using the landfill gas production and recovery data in Table 2. The curves demonstrate the landfill gas generation and recovery rates over time and the straight, vertical line indicates the current year.

Though this landfill appears to be very young, it does seem to have some significant LFG generation potential in the future. The estimated LFG extraction rate for this year is estimated to be approximately 293 scfm. Based on this estimate, it would appear that the site would be capable of supporting a small reciprocating engine (< 1 MW), multiple microturbines, or a greenhouse project (boiler option). As this landfill matures, it may have the potential to support a 5 MW power project. There is also the potential to sell the LFG as a medium or high-BTU fuel to a pipeline transporter. Beneficial-use options are somewhat limited because of the remote location of the landfill.

These projections have been prepared specifically for the Golden Triangle Regional Landfill on behalf of the U.S. EPA Landfill Methane Outreach Program (LMOP), and are based on engineering judgement and represent the standard of care that would be exercised by a professional reasonably experienced in the field of landfill gas projections. LMOP and its contractors ERG and EMCON do not guarantee the quantity of available landfill gas, and no other warranty is expressed or implied. No other party is intended as a beneficiary of this work product, its content, or information embedded therein. Third parties use this information at their own risk. LMOP and its contractors ERG and EMCON assume no responsibility for the accuracy of information obtained from, compiled, or

provided by other parties.

References

1. Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources. Chapter 2: Solid Waste Disposal. Section 2.4.4.1. U.S. EPA. November 1998. <http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s04.pdf>
2. Landfill Gas Emissions Model, version 2.01. U.S. EPA. January 6, 1999. <http://www.epa.gov/ttn/catc/products.html>
3. Email correspondence from Jimmy Sloan, Golden Triangle Regional SW Mgmt. Authority, to Juene Franklin, EMCON. February 15, 2002. Shown in Appendix A.

Appendix A

E-mail Containing Data for the Golden Triangle Regional Landfill

From: GTR Landfill [mailto:gtrswma@wpms.net]
Sent: Friday, February 15, 2002 2:09 PM
To: JKFranklin@TheITGroup.com; guzzone.brian@epa.gov
Subject: Pre-Screening information for landfill gas feasibility studies/energy and user analyses

LANDFILL PRE-SCREENING INFORMATION FOR FEASIBILITY STUDIES/EEUA

Exact landfill name: Golden Triangle Regional Landfill

EPA landfill ID number: N/A

City where landfill is located: Starkville, MS

County where landfill is located: Clay and Oktibbeha

Landfill owner name: Golden Triangle Regional Solid Waste Management Authority

Landfill mailing/street address city, state, zip: P.O. Box 161, Starkville, MS 39760
2505 Old West Point Rd., Starkville, MS

Landfill owner contact person, phone, fax, e-mail: Jimmy Sloan, Executive Director
(662) 324-7566 (F) (662) 320-9212
jsloan@wpms.net <mailto:jsloan@wpms.net>

Landfill owner type (public or private): public

Landfill operator (if different from owner): same

Landfill operator contact person, phone, fax, e-mail: same

Year landfill opened: October 1, 1996

Year landfill (or individual cells) closed: None closed yet

Landfill area (acres): Footprint permitted = 264 acres
Total ownership = 667 acres

Waste depth (feet): Maximum to be = 175'
Currently maximum = 50'

Waste in place (tons): As of January 16, 2002 - 610,949 tons

Annual waste acceptance rate (tons/year): 130,000 tons

Landfill subject to NSPS/ EG?(yes/no):

Total capacity of permitted site: 31,000,000CY or 15,460,000 tons of waste

Please provide a brief description of NSPS/EG status: Have performed Tier II testing, system installation not required at this time.

Describe any development activities to date:

Electric utility servicing the landfill: 4-County Electric Power Assn.

Natural gas utility servicing the landfill or vicinity: N/A on site - Area = MS Valley

Potential end-users of the LFG within 10-mile radius of landfill (if known): unknown